FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
H&U104	
U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR	
not known 09/831216	

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/07151	25 September 1999	5 November 1998

TITLE OF INVENTION

AGENT FOR REPELLING AND INACTIVATING PATHOGENIC ORGANISMS OF PLANTS

APPLICANT(S) FOR DO/EO/US

NEVERMANN, Jan ZERLING, Wolfgang
HOFFLER, Jutta

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☒ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☒ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☒ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Verification of translation; power of attorney (part of Declaration)

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/831216 not known	PCT/EP99/07151	H&U104

24. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	**$1000.00**
☒	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	**$860.00**
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	**$710.00**
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	**$690.00**
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)	**$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =	**$860.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	12 - 20 =	0	x $18.00	**$0.00**	
Independent claims	2 - 3 =	0	x $80.00	**$0.00**	
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**	
TOTAL OF ABOVE CALCULATIONS =				**$860.00**	
☒ Applicant claims small entity status. (See 37 CFR 1.27). The fees indicated above are reduced by 1/2.				**$430.00**	
SUBTOTAL =				**$430.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +				**$0.00**	
TOTAL NATIONAL FEE =				**$430.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☒				**$40.00**	
TOTAL FEES ENCLOSED =				**$470.00**	
				Amount to be: refunded	$
				charged	$

a. ☒ A check in the amount of **$470.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **500867** A duplicate copy of this sheet is enclosed.

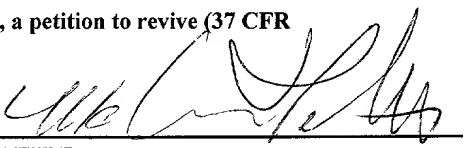
d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Marlana Titus
Nash & Titus, LLC
3415 Brookeville Road
Suite 1000
Brookeville, MD 20833

(301) 924-9600



SIGNATURE

Marlana Titus

NAME

35,843

REGISTRATION NUMBER

May 4, 2001

DATE

US National application of
PCT/EP99/07151

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of

NEVERMANN, et al.

Group Art Unit: not known

Application No. not known
US national app. of PCT/EP99/07151

Examiner: not known

Filed: April 27, 2001

For: AGENT FOR REPELLING AND INACTIVATING PATHOGENIC ORGANISMS OF PLANTS

* * * * *

May 4, 2001

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
And Trademarks
Washington, D.C. 20231

Sir:

In connection with the above-identified application, please enter the following amendments. **Please calculate fees after entry of this Preliminary Amendment.**

IN THE CLAIMS:

Please cancel claims 1-10 without prejudice or disclaimer.

Please add new claims 11-22 in lieu thereof.

--11. (New) A disinfecting agent for combating and inactivating phytopathogenic organisms that are present on plants and in the immediate environment of plants, said agent comprising at least one anionic surfactant, at least one aliphatic carboxylic acid, at

least one aromatic carboxylic acid, and mono-, di- and/or triglycols, in aqueous or aqueous-alcoholic solution.

12. (New) The disinfecting agent according to claim 1, wherein the aliphatic and aromatic carboxylic acids are selected from the group consisting of methanoic acid, ethanoic acid, propanoic acid, hydroxyethanoic acid, 2-hydroxypropionic acid, oxoethanoic acid, 2-oxopropionic acid, 4-oxovaleric acid, benzoic acid, o-, m-, p-hydroxybenzoic acids, 3,4,5-tri-hydroxybenzoic acid, and mixtures thereof, and wherein the anionic surfactant has a primary chains of a length of $C_8 - C_{18}$ and is selected from the group consisting of alkyl sulfonates, alkylarylsulfonates, the sodium-, potassium- and ammonium salts of alkyl sulfonates and alkylarylsulfonates.

13. (New) The disinfecting agent according to claim 1, wherein the mono-, di- and/or triglycols are selected from the group consisting of ethylene glycol, propylene glycol, 2,3-butylene glycol, diethylene glycol [2,2'-dihydroxydiethylether], triethylene glycol [(1,2-di-2-hydroxyethoxyl-ethane], and mixtures thereof.

14. (New) The disinfecting agent according to claim 1, which comprises a hydrotropic agent.

15. (New) The disinfecting agent according to claim 4, wherein the hydrotropic agent is toluene sulfonate and/or cumene sulfonate as sodium- or potassium salts and primary and/or secondary aliphatic, monovalent alcohols having a chain length of $C_2 - C_8$, individually or as a mixture.

16. (New) The disinfecting agent according to claim 5, wherein the monovalent alcohols having a chain length of $C_2 - C_8$ is a monovalent alcohol.

17. (New) The disinfecting agent according to claim 1, wherein the weight ratio of the aliphatic acids (A) to the aromatic acids (B) is between 1 : 9 and 9 : 1 and their

sum is between 5 and 40 % by wt. relative to the total weight of the disinfecting-agent concentrate.

18. (New) The disinfecting agent according to claim 1, wherein the weight ratio of the alkyl sulfonates and/or alkylarylsulfates and their salts (C) with the acids (A+B) in the ratio C : (B+A) is between 1 : 9 and 9 : 1 and their sum is between 10 and 60 % relative to the total weight of the disinfecting-agent concentrate.

19. (New) The disinfecting agent according to claim 1, wherein the weight component of the glycols relative to the total weight of the disinfecting-agent concentrate is between 10 and 40 % by wt.

20. (New) The disinfecting agent according to claim 1, wherein the weight ratio of the hydrotropic agents toluene sulfonate and cumene sulfonate, their sodium- or potassium salts, individually or in a mixture with each other, is between 5 and 40 % by wt. relative to the total weight of the disinfecting-agent concentrate.

21. (New) The disinfecting agent according to claim 1, wherein the weight ratio of the monovalent alcohols, individually or in a mixture with each other, is between 5 and 60 % by wt. relative to the total weight of the disinfecting-agent concentrate.

22. (New) A method for combating phytopathogenic microorganisms present on plant or in its immediate environment, comprising the step of applying to the plant and/or to its immediate environment a composition containing 0.5 to 10 % by wt. of a disinfection agent concentrate in dilute aqueous solution, which disinfecting agent comprises at least one anionic surfactant, at least one aliphatic carboxylic acid, at least one aromatic carboxylic acid, and mono-, di- and/or triglycols, in aqueous or aqueous-alcoholic solution. --

US National application of

PCT/EP99/07151

REMARKS

An early and favorable action on the merits is respectfully requested.

Respectfully submitted,

Marlana K. Titus
Nash & Titus, LLC
Reg. No. 35,843

Nash & Titus, LLC
3415 Brookeville Road
Suite 1000
Brookeville, MD 20833
(301) 924-9600

AGENTS FOR REPELLING AND INACTIVATING PATHOGENIC ORGANISMS OF PLANTS

Every year, truck farms, meristem operations and plant cultivators sustain great damage due to organisms [germs] that infect sets [plantlets], young plants, mother plans and seeds, destroying them or rendering them useless. If, for example, viruses enter a cultivation, it can be assumed that 100 % of the plants will be damaged. The only option open to the truck farms then is the radical measure of destroying the entire culture.

Specifically active agents are commercially available with which a few phytopathogens can be combated without influencing the vitality of the plant. These agents, designated as pesticides, are systemically effective but usually have only a narrow spectrum of activity.

On the other hand, a significantly broader spectrum of activity is offered by common disinfecting agents based on aldehydes, phenols, halogens, peroxides and quaternary ammonium compounds. If these "surface disinfecting agents" get on the plant or are directly applied to the plant, this always entails irreversible damage to the plant. This means that such disinfecting agents can only be used on working surfaces, positioning surfaces and devices such as, e.g., knives and the like. The surfaces must be freed thereafter from adhering remnants of active substances in order not to endanger the plants during subsequent working steps.

However, a sufficient inactivation is not even assured on surfaces since these agents always exhibit significant gaps in their activity against phytopathogenic organisms.

DE OS 32 27 126 and DE OS 32 29 097 teach that certain combinations of anionic surfactants, aliphatic and aromatic carboxylic acids as well as a few heteroaromatic acids are capable of comprehensively killing off or inactivating viruses, bacteria and fungi without gaps in their activity.

The microbes tested according to the above-cited Offenlegungsschriften and patents were primarily human-pathogenic organisms with a low infectiousness like those recommended as test microbes by, among others, the German Society for Hygiene and Microbiology (DGHM) and the German Society for Veterinary Medicine (DVG).

The application of the teaching to highly infectious and resistant phytopathogenic organisms displayed a microbicidal and virus-inactivating activity that was just as persevering as had already been shown to be the case with the human-pathogenic test germs.

However, further tests for plant compatibility with the same agents regularly resulted in a damaging of the test plants in the form of severe scorching, so that the use on plants appeared to be excluded.

It was surprisingly found that the use of certain acid combinations and surfactant combinations in the presence of glycols overcomes the previous deficiency in the combating of phytopathogenic organisms and that when applied directly onto a plant they retain a pronounced bactericidal, fungicidal

and viricidal activity and do not damage the plant cells (roots, stems, leaves, flowers and fruit) in the application concentration.

The present invention has as subject matter agents for treating plants and their environment with the goal of killing off phytopathogenic bacteria, fungi, viruses and viroids and to hinder their spread. Even pathogens that are already on plants can be killed off or inactivated (viruses) by these agents by moistening roots, stems, leaves and flowers without damaging the plant cells. The biological behavior of the plant is also not altered by the treatment. Working areas in the vicinity of the plants (e.g., tables, knives, positioning surfaces) that could cause a contamination are also freed in a persevering [lasting] manner of noxious organisms therewith without phytotoxic residues having to be subsequently removed.

Examples for formulating the agents according to the patent claim[s]

The following examples are intended to explain the patent claim[s] without limiting them.

Example 1)

Components	Parts by weight (%)
Alkylarylsulfonate potassium	8.50 % by wt.

Propane diol-1,2	20.50
Toluene sulfonate potassium	10.00
p-Hydroxybenzoic acid	6.90
Hydroxyethanoic acid	3.80
Propanol-2	28.00
Water (desalinated)	18.50

Example 2)

Alkylsulfonate potassium	10.00 % by wt.
Ethane diol-1,2	15.00
Cumene [cumol] sulfonate potassium	10.00
p-Hydroxybenzoic acid	6.90
Oxoethanoic acid	7.00
Propanol-1	15.00
Propanol-2	15.00
Water (desalinated)	18.50

Example 3)

Alkylarylsulfonate potassium	12.00 % by wt.
Ethane diol-1,2	18.00
Cumene [cumol] sulfonate potassium	8.00

Benzoic acid	7.00
2-Hydroxypropionic acid	7.00
Propanol-1	20.00
Propanol-2	15.00
Water (desalinated)	13.00

Example 4)

Components	Parts by weight (%)
Alkylsulfonate (C8-C18) potassium	7.00 % by wt.
Alkylsulfonate (C12) potassium	3.00
Ethane diol-1,2	12.00
Cumene [cumol] sulfonate potassium	11.50
Benzoic acid	9.00
2-Hydroxyethanoic acid	4.50
Propanol-1	15.00
Propanol-2	15.00
Water (desalinated)	23.00

Example 5)

Alkylarylsulfonate sodium	12.00 % by wt.
Cumene [cumol] sulfonate sodium	8.50

o-Hydroxybenzoic acid	9.50
2-Hydroxypropionic acid	5.00
Propanol-1	22.00
Propanol-2	20.00
Water (desalinated)	23.50

Bactericidal activity on the plant (biotest)

A. Young plant pelargoniums and begonias were contaminated by spraying with Xanthomonas campestris. A leaf surface of 1 cm^2 had 10^4 KBE after the contamination.

A treatment with example 4 in concentrations of 1.0 %, 2.0 % and 3.0 % took place, also with a spraying method, one hour after the inoculation.

Specimens were taken one hour after the treatment. The germs of the treated and of the untreated controls (without example 4) were removed from the leaves by ultrasound (wash liquid of 0 °C) and their number determined.

B. Pelargoniums and begonias were treated by spraying with example 4.

The contamination with Xanthomonas campestris took place, also with a spraying method, 24 hours after the treatment with example 4.

Specimens were taken one hour after the contamination. The germs of the treated and of the untreated controls (without example 4) were removed

from the leaves by ultrasound (wash liquid of 0 °C) and their number determined.

Scorching, lesions on the leaf edges and the leaf blades, germ reduction and leaf compatibility are cited in the following table:

		Pelargoniums		Begonias	
A	Concentration	Germ reduction	Toxic phenomena on leaves	Germ reduction	Toxic phenomena on leaves
	1.0% example 4	97%;93%	No lesions	<99%	No lesions
	2.0% example 4	100%;99.5 %	No lesions	99.9%	No lesions
	3.0% example 4	100%;99.9 %	A few leaf edge lesions	99.9%	Slight lesions on leaf edges
	1.0% example 5	98%;95%	Lesions on the leaf edges	99.5%; 99.7%	Lesions on the leaf edges and leaf blades
	2.0% example 5	100%;100 %	Lesions on the leaf edges and leaf blades	99.9%;99.9 %	Scorching on the leaf edges and the leaf blades
	3.0% example 5	100%;94%	Many lesions on the leaf edges and leaf blades	100%;100%	Scorching on the leaf edges and the leaf blades
B	1.0% example 4	98%	No lesions	95%	No lesions

Plant compatibility

Maximal tolerable concentrations of formulation examples 2, 4 and 5 on plant organs

[numerical and sign data require no translation]

Examples	**Plant organ**	**Phalaenopsis**[1] **Damage** **Lesions** **BR** **BS**
1.0 % example 2	Flowers	0
	Leaves	
	Flowers	
	Leaves	
	Flowers	

	Leaves	

Lesion. = Lesions

+++ = very many / very heavily damaged

++ = very / heavily damaged

\+ = few / slightly damaged

0 = none / not damaged

BR = leaf edges

BS = leaf blades

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[1] orchid type

The test for a sufficient inactivation of phytopathogenic organisms resulted in the following results:

1. Bactericidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated bacterial strains

Examples	Xanthomonas pelargonii	Pseudomonas solanaceum	Erwinia amylovora
Tap water control	No activity	No activity	No activity
1.0% example 1	1 min.		
[see p. 8 for rest	of data]		

2. Fungicidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated fungus test strains

Example	Fusarium oxysporum	Thielaviopsis basicola	Phythophtora sp	Cylindrocladium scoparium
Tap water control	No activity	No activity	No activity	No activity
1.0% example 1	16 h	> 16 h	1 h	> 16 h
[see p. 8 for rest	of data]			

Required contact times of examples 1 – 5 for inactivating the indicated viral strains (suspension test)

Disinfecting agent	TMV	PBY	PFBV	CNV	ORSV	PSTVd
Tap water control	No activity	No activity	No activity	No activity	No activity	No activity
1.0% example 1 2.0% example 1 3.0% example 1	16 h	16h	4 h	16 h	4 h	4 h
[see page 9 for	rest of	data]				

TMV = Tobacco mosaic virus

PVY = Potato virus Y Potyvirus

PFBV = Pelargonium flower break carmovirus

CNV = Cucumber necrosis tombuvirus

ORSV = Odontoglossum ringspot virus

PSTVd = Potato spindle tuber viroid

[page 10 duplicates the top half of page 8 of the original down to the bottom of the graph (page 11, bottom, and page 12, top, above)]

CLAIMS:

1. Disinfecting agents for combating and inactivating phytopathogenic organisms for use on plants and in their environment, based on a synergistically active mixture that can contain anion-active surfactants, aliphatic carboxylic acids, aromatic carboxylic acids, di- and triglycols, hydrotropic agents and primary and/or secondary, aliphatic, monovalent alcohols with a chain length of C2 – C8 as solvent, characterized in that

a) They contain synergistically active microbicidal combinations of aliphatic and aromatic carboxylic acids, preferably methanoic acid, ethanoic acid, propanoic acid, hydroxyethanoic acid, 2-hydroxypropionic acid, oxoethanoic acid, 2-oxopropionic acid, 4-oxovaleric acid, benzoic acid, o-, m-, p-hydroxybenzoic acids, 3,4,5-tri-hydroxybenzoic acid, individually or mixed, in combination with alkyl sulfonates and/or alkylarylsulfonates and their sodium-, potassium- and ammonium salts, with primary chains with a length of C8 – C18 as anionic surfactants,

b) They contain ethylene glycol, propylene glycol, 2,3-butylene glycol, diethylene glycol (2,2'-dihydroxydiethylether), triethylene glycol (1,2-di-(2-hydroxyethoxyl)-ethane) individually or in a mixture with each other,

c) They contain toluene sulfonates and/or cymene sulfonates as sodium- or potassium salt and monovalent alcohols as solvent, individually or as a mixture.

2. The disinfecting agents according to claim 1, characterized in that the weight ratio of the aliphatic acids (A) to the aromatic acids (B) can be between 1 : 9 and 9 : 1 and their sum can be between 5 and 40 % by wt. relative to the total weight of the disinfecting-agent concentrate.

3. The disinfecting agents according to claims 1 and 2, characterized in that the weight ratio of the alkyl sulfonates and/or alkylarylsulfates and their salts (C) with the acids (A+B) in the ratio C : (B+A) can be = 1 : 9 and 9 : 1 and their sum can be between 10 and 60 % relative to the total weight of the disinfecting-agent concentrate.

4. The disinfecting agents according to claim 1, characterized in that the weight component of the glycols relative to the total weight of the disinfecting-agent concentrate can be between 10 and 40 % by wt.

5. The disinfecting agents according to claim 1, characterized in that the weight ratio of the hydrotropic agents toluene sulfonate and cumene sulfonate, their sodium- or potassium salts, individually or in a mixture with each other, can be between 5 and 40 % by wt. relative to the total weight of the disinfecting-agent concentrate.

6. The disinfecting agents according to claim 1, characterized in that the weight ratio of the monovalent alcohols, individually or in a mixture with

each other, can be between 5 and 60 % by wt. relative to the total weight of the disinfecting-agent concentrate.

7. The use of the disinfecting agents according to one of claims 1 to 6 for combating phytopathogenic bacteria, fungi, viruses and viroids on a vital plant and its environment.

8. The use of the disinfecting agents according to one of claims 1 to 6 in dilute aqueous solutions that can contain between 0.5 and 10 % by wt. of the disinfecting-agent concentrate.

AGENTS FOR REPELLING AND INACTIVATING PATHOGENIC ORGANISMS OF PLANTS

BACKGROUND OF THE INVENTION

Every year, truck farms, meristem operations and plant cultivators sustain great damage due to organisms that infect sets (e.g. plantlets), young plants, mother plants and seeds, destroying them or rendering them useless. If, for example, viruses enter a cultivation, it can be assumed that 100 % of the plants will be damaged. The only option open to the truck farms then is the radical measure of destroying the entire culture.

Specifically active agents are commercially available with which a few phytopathogens can be combated without influencing the vitality of the plant. These agents, designated as pesticides, are systemically effective but usually have only a narrow spectrum of activity.

On the other hand, a significantly broader spectrum of activity is offered by common disinfecting agents based on aldehydes, phenols, halogens, peroxides and quaternary ammonium compounds. If these "surface disinfecting agents" get on the plant or are directly applied to the plant, this always entails irreversible damage to the plant. This means that such disinfecting agents can only be used on working surfaces, positioning surfaces and devices such as, e.g., knives and the like. The surfaces must be freed thereafter from adhering remnants of active substances in order not to endanger the plants during subsequent working steps.

However, a sufficient inactivation is not even assured on surfaces since these agents always exhibit significant gaps in their activity against phytopathogenic organisms.

DE OS 32 27 126 and DE OS 32 29 097 teach that certain combinations of anionic surfactants, aliphatic and aromatic carboxylic acids as well as a few heteroaromatic acids

are capable of comprehensively killing off or inactivating viruses, bacteria and fungi without gaps in their activity.

The microbes tested according to the above-cited Offenlegungsschriften and patents were primarily human-pathogenic organisms with a low infectiousness like those recommended as test microbes by, among others, the German Society for Hygiene and Microbiology (DGHM) and the German Society for Veterinary Medicine (DVG).

The application of the teaching to highly infectious and resistant phytopathogenic organisms displayed a microbicidal and virus-inactivating activity that was just as persevering as had already been shown to be the case with the human-pathogenic test germs.

However, further tests for plant compatibility with the same agents regularly resulted in a damaging of the test plants in the form of severe scorching, so that the use on plants appeared to be excluded.

It was surprisingly found that the use of certain acid combinations and surfactant combinations in the presence of glycols overcomes the previous deficiency in the combating of phytopathogenic organisms, and that, when applied directly onto a plant, they retain a pronounced bactericidal, fungicidal and viricidal activity and do not damage the plant cells (roots, stems, leaves, flowers and fruit) in the application concentration.

SUMMARY OF THE INVENTION

The present invention relates to agents for treating plants and their environment with the goal of killing off phytopathogenic bacteria, fungi, viruses and viroids and of hindering their spread. Even pathogens (e.g., viruses) that are already on plants can be killed off or inactivated by these agents by moistening roots, stems, leaves and flowers without damaging the plant cells. The biological behavior of the plant is also not altered by the treatment. Working areas in the vicinity of the plants (e.g., tables, knives,

positioning surfaces) that could cause a contamination are also freed in a long-lasting manner of noxious organisms therewith without phytotoxic residues having to be subsequently removed.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

The invention is further described in the following non-limiting examples.

Example 1)

Components	Parts by weight (%)
Alkylarylsulfonate potassium	8.50 % by wt.
Propane diol-1,2	20.50
Toluene sulfonate potassium	10.00
p-Hydroxybenzoic acid	6.90
Hydroxyethanoic acid	3.80
Propanol-2	28.00
Water (desalinated)	18.50

Example 2)

Components	Parts by weight (%)
Alkylsulfonate potassium	10.00 % by wt.
Ethane diol-1,2	15.00
Cumene [cumol] sulfonate potassium	10.00
p-Hydroxybenzoic acid	6.90
Oxoethanoic acid	7.00

Propanol-1	15.00
Propanol-2	15.00
Water (desalinated)	18.50

Example 3)

Components	Parts by weight (%)
Alkylarylsulfonate potassium	12.00 % by wt.
Ethane diol-1,2	18.00
Cumene [cumol] sulfonate potassium	8.00
Benzoic acid	7.00
2-Hydroxypropionic acid	7.00
Propanol-1	20.00
Propanol-2	15.00
Water (desalinated)	13.00

Example 4)

Components	Parts by weight (%)
Alkylsulfonate (C8-C18) potassium	7.00 % by wt.
Alkylsulfonate (C12) potassium	3.00
Ethane diol-1,2	12.00
Cumene [cumol] sulfonate potassium	11.50
Benzoic acid	9.00
2-Hydroxyethanoic acid	4.50
Propanol-1	15.00

Propanol-2	15.00
Water (desalinated)	23.00

Example 5)

Components	Parts by weight (%)
Alkylarylsulfonate sodium	12.00 % by wt.
Cumene [cumol] sulfonate sodium	8.50
o-Hydroxybenzoic acid	9.50
2-Hydroxypropionic acid	5.00
Propanol-1	22.00
Propanol-2	20.00
Water (desalinated)	23.50

Bactericidal activity on the plant (biotest)

A. Young plant pelargoniums and begonias were contaminated by spraying with Xanthomonas campestris. A leaf surface of 1 cm^2 had 10^4 KBE after the contamination.

A treatment with example 4 in concentrations of 1.0 %, 2.0 % and 3.0 % was conducted, also with a spraying method, one hour after the inoculation.

Specimens were taken one hour after the treatment. The germs of the treated and of the untreated controls (without example 4) were removed from the leaves by ultrasound (wash liquid of 0 °C) and their number determined.

B. Pelargoniums and begonias were treated by spraying with example 4.

The contamination with Xanthomonas campestris took place, also with a spraying method, 24 hours after the treatment with example 4.

Specimens were taken one hour after the contamination. The germs of the treated and of the untreated controls (without example 4) were removed from the leaves by ultrasound (wash liquid of 0 °C) and their number determined.

Scorching, lesions on the leaf edges and the leaf blades, germ reduction and leaf compatibility are cited in the following table:

		Pelargoniums		Begonias	
A	Concentration	Germ reduction	Toxic phenomena on leaves	Germ reduction	Toxic phenomena on leaves
	1.0% example 4	97%;93%	No lesions	<99%	No lesions
	2.0% example 4	100%;99.5 %	No lesions	99.9%	No lesions
	3.0% example 4	100%;99.9 %	A few leaf edge lesions	99.9%	Slight lesions on leaf edges
	1.0% example 5	98%;95%	Lesions on the leaf edges	99.5%; 99.7%	Lesions on the leaf edges and leaf blades
	2.0% example 5	100%;100 %	Lesions on the leaf edges and leaf blades	99.9%;99.9 %	Scorching on the leaf edges and the leaf blades
	3.0% example 5	100%;94%	Many lesions on the leaf edges and leaf blades	100%;100%	Scorching on the leaf edges and the leaf blades
B	1.0% example 4	98%	No lesions	95%	No lesions

Plant compatibility

Maximal tolerable concentrations of formulation examples 2, 4 and 5 on plant organs

[numerical and sign data require no translation]

Examples	**Plant organ**	**Phalaenopsis**[1]		
		Damage	**Lesions**	
			BR	**BS**
1.0 % example 2	Flowers	0		
2.0% example 2		0		
3.0% example 2		0		
1.0% example 2	Leaves	0	0	0
2.0% example 2		0	0	0
3.0% example 2		+	+	0
1.0% example 4	Flowers	0		
2.0% example 4		0		
3.0% example 4		0		
1.0% example 4	Leaves	0	0	0
2.0% example 4		0	0	0
3.0% example 4		+	++	0
1.0% example 5	Flowers	++		
2.0% example 5		++		
3.0% example 5		+++	+++	+++

1.0% example 5	Leaves	+	++	++
2.0% example 5		++	+++	++
3.0% example 5		+++	+++	+++

Lesion. = Lesions

+++ = very many / very heavily damaged

++ = very / heavily damaged

+ = few / slightly damaged

0 = none / not damaged

BR = leaf edges

BS = leaf blades

[1] orchid type

The test for a sufficient inactivation of phytopathogenic organisms gave in the following results:

1. Bactericidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated bacterial strains

Examples	Xanthomonas pelargonii	Pseudomonas solanaceum	Erwinia amylovora
Tap water control	No activity	No activity	No activity
1.0% example 1	1 min.	1 min.	5 min.
1.0% example 2	1 min.	1 min	1 min
1.0% example 3	5 min	5 min	15 min
1.0% example 4	1 min	1 min	1 min
1.0% example 5	1 min	1 min	1 min

2. Fungicidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated fungus test strains

Example	Fusarium oxysporum	Thielaviopsis basicola	Phythophtora sp	Cylindrocladium scoparium
Tap water control	No activity	No activity	No activity	No activity
1.0%example 1 2.0%example 1	16 h 4 h	> 16 h 4 h	1 h 1 h	> 16 h > 16 h
1.0%example 2	4 h	4 h	1 h	> 16 h

2.0%example 2	1 h	1 h	5 min	16 h
1.0%example 3	4 h	16 h	1 h	16 h
2.0%example 3	4 h	4 h	30 min	4 h
1.0%example 4	1 h	4 h	30 min	16 h
2.0%example 4	1 h	1 h	15 min	4 h
1.0%example 5	1 h	4 h	1 h	16 h
2.0%example 5	1 h	1 h	5 min	16 h

Required contact times of examples 1 – 5 for inactivating the indicated viral strains (suspension test)

Disinfecting agent	TMV	PBY	PFBV	CNV	ORSV	PSTVd
Tap water control	No activity	No activity	No activity	No activity	No activity	No activity
1.0% example 1	16 h	16 h	4 h	16 h	4 h	4 h
2.0% example 1	16 h	4 h	1 h	4 h	1 h	1 h
3.0% example 1	16 h	4 h	1 h	4 h	1 h	< 1 h
1.0% example 2	> 16 h	16 h	4 h	16 h	1 h	4 h
2.0% example 2	16 h	4 h	1 h	4 h	< 1 h	1 h
3.0% example 2	4 h	4 h	1 h	4 h	< 1 h	1 h
1.0% example 3	> 16 h	16 h	4 h	1 h	4 h	4 h
2.0% example 3	16 h	4 h	1 h	< 1 h	4 h	1 h
3.0% example 3	16 h	4 h	1 h	< 1 h	1 h	1 h
1.0% example 4	4 h	4 h	1 h	< 1 h	4 h	1 h

2.0% example 4	4 h	1 h	< 1 h	< 1 h	1 h	< 1 h
3.0% example 4	1 h	1 h	< 1 h	< 1 h	1 h	< 1 h
1.0% example 5	4 h	4 h	1 h	< 1 h	4 h	1 h
2.0% example 5	4 h	4 h	1 h	< 1 h	1 h	1h
3.0% example 5	1 h	1 h	< 1 h	< 1 h	1 h	< 1 h

TMV = Tobacco mosaic virus

PVY = Potato virus Y Potyvirus

PFBV = Pelargonium flower break carmovirus

CNV = Cucumber necrosis tombuvirus

ORSV = Odontoglossum ringspot virus

PSTVd = Potato spindle tuber viroid

The test for a sufficient inactivation of phytopathogenic organisms gave in the following results:

1. Bactericidal action of examples 1 – 5 in a lab test according to "Guideline 16-4 for the Testing of Plant Protection Products for Disinfection in the Cultivation of Decorative Plants" of the Biological Federal Institute for Agriculture and Forestry (Braunschweig, 1986)

Required contact times of examples 1 – 5 for killing off the indicated bacterial strains

Examples	Xanthomonas pelargonii	Pseudomonas solanaceum	Erwinia amylovora
Tap water control	No activity	No activity	No activity
1.0% example 1	1 min.	1 min.	5 min.
1.0% example 2	1 min.	1 min	1 min
1.0% example 3	5 min	5 min	15 min
1.0% example 4	1 min	1 min	1 min
1.0% example 5	1 min	1 min	1 min

CLAIMS

(as per clarified set filed November 29, 2000 in Response to PCT Written Opinion):

1. Disinfecting agents for combating and inactivating phytopathogenic organisms for use on plants and in the environment of plants, containing anionic surfactants, aliphatic and aromatic carboxylic acids in aqueous or aqueous-alcoholic solutions, characterized in that they contain mono-, di- and/or triglycols.

2. The disinfecting agents according to claim 1, characterized in that they contain aliphatic and aromatic carboxylic acids, preferably synergistically active microbicidal combinations of aliphatic and aromatic carboxylic acids, preferably methanoic acid, ethanoic acid, propanoic acid, hydroxyethanoic acid, 2-hydroxypropionic acid, oxoethanoic acid, 2-oxopropionic acid, 4-oxovaleric acid, benzoic acid, o-, m-, p-hydroxybenzoic acids, 3,4,5-tri-hydroxybenzoic acid, individually or mixed, in combination with alkyl sulfonates and/or alkylarylsulfonates and their sodium-, potassium- and ammonium salts, with primary chains with a length of C8 – C18 as anionic surfactants.

3. The disinfecting agents according to claim 1 or 2, characterized in that they contain ethylene glycol, propylene glycol, 2,3-butylene glycol, diethylene glycol [2,2'-dihydroxydiethylether], triethylene glycol [(1,2-di-2-hydroxyethoxyl-ethane] [sic] individually or in a mixture with each other,

4. The disinfecting agents according to claims 1 to 3, characterized in that they contain hydrotropic agents, in particular toluene sulfonate and/or cumene sulfonate as sodium- or potassium salts and primary and/or secondary aliphatic, monovalent alcohols

with a chain length of C2 – C8, preferably monovalent alcohols, individually or as a mixture.

5. The disinfecting agents according to claims 1 to 4, characterized in that the weight ratio of the aliphatic acids (A) to the aromatic acids (B) can be between 1 : 9 and 9 : 1 and their sum can be between 5 and 40 % by wt. relative to the total weight of the disinfecting-agent concentrate.

6. The disinfecting agents according to claims 1 to 5, characterized in that the weight ratio of the alkyl sulfonates and/or alkylarylsulfates and their salts (C) with the acids (A+B) in the ratio C : (B+A) can be = 1 : 9 and 9 : 1 and their sum can be between 10 and 60 % relative to the total weight of the disinfecting-agent concentrate.

7. The disinfecting agents according to claims 1 to 6, characterized in that the weight component of the glycols relative to the total weight of the disinfecting-agent concentrate can be between 10 and 40 % by wt.

8. The disinfecting agents according to claims 1 to 7, characterized in that the weight ratio of the hydrotropic agents toluene sulfonate and cumene sulfonate, their sodium- or potassium salts, individually or in a mixture with each other, can be between 5 and 40 % by wt. relative to the total weight of the disinfecting-agent concentrate.

9. The disinfecting agents according to claims 1 to 8, characterized in that with each other, can be between 5 and 60 % by wt. relative to the total weight of the disinfecting-agent concentrate.

10. The use of the disinfecting agents according to claims 1 to 9 for combating phytopathogenic microorganisms on a vital plant or in its environment, characterized by a content of 0.5 to 10 % by wt. of the disinfection-agent concentrate in dilute aqueous solutions.

ABSTRACT OF THE INVENTION

The invention relates to disinfecting agents for combating and inactivating phytopathogenic organisms for use on plants and in their environment. The agents are based on a mixture of anionic, active surfactants, aliphatic and aromatic carboxylic acids, glycols, hydrotropic agents and aliphatic, monovalent alcohol, and are characterized in that they contain, together with hydrotropic agents and monovalent alcohols, a combination of aliphatic and aromatic carboxylic acids determined from alkyl- and/or alkylarylsulfonates as well as contain glycols determined individually or in a mixture as solvent.

Docket No.
H&U104

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

AGENT FOR REPELLING AND INACTIVATING PATHOGENIC ORGANISM OF PLANTS

☐ the specification of which

(check one)

☐ is attached hereto.

☒ was filed on April 27, 2001 as United States Application No. or PCT International Application Number _____

and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Not Claimed
198 50 994.4	Germany (DE)	05/11/98	☐
(Number)	(Country)	(Day/Month/Year Filed)	
PCT/EP99/07151	International app.	25/09/99	☐
(Number)	(Country)	(Day/Month/Year Filed)	
			☐
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
PCT/EP99/07151	25/09/99	pending
(Application Serial No)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

Marlana Titus, Reg. No. 35,843
Caroline Nash, Reg. No. 36,329

Send Correspondence to. **Marlana Titus**
Nash & Titus, LLC
3415 Brookeville Rd., Suite 1000
Brookeville, MD 20833

Direct Telephone Calls to: *(name and telephone number)*
Marlana Titus (301) 924-9600

Full name of sole or first inventor
NEVERMANN, Jan

Sole or first inventor's signature — Date: 23.04.01

Residence
Schillerstrasse 7, D-22848 Norderstedt, Germany DEX

Citizenship
Germany

Post Office Address
Schillerstrasse 7, D-22848 Norderstedt, Germany

Full name of second inventor, if any
ZERLING, Wolfgang

Second inventor's signature — Date: 23.04.01

Residence
Kallieser Stieg 6, D-24568 Kaltenkirchen, Germany DEX

Citizenship
Germany

Post Office Address
Kallieser Stieg 6, D-24568 Kaltenkirchen, Germany

300

Full name of third inventor, if any
HOFFLER, Jutta

Third inventor's signature

26.04.2001
Date

Residence
Woldsenweg 7, D-20249 Hamburg, Germany DEX

Citizenship
Germany

Post Office Address
Woldsenweg 7, D-20249 Hamburg, Germany

Full name of fourth inventor, if any

Fourth inventor's signature

Date

Residence

Citizenship

Post Office Address

Full name of fifth inventor, if any

Fifth inventor's signature

Date

Residence

Citizenship

Post Office Address

Full name of sixth inventor, if any

Sixth inventor's signature

Date

Residence

Citizenship

Post Office Address